NIKKO TUNER

GAMMA 40

STEREO FM TUNER

TYPE AND VOLTAGE

W-TYPE:	UL and CSA type	120V AC
E -TYPE:	NK-STD type	220V AC
B -TYPE:	BS type	240V AC

SERVICE MANUAL

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SPECIFICATIONS

ITEM	IF BAND "WIDE"	IF BAND "NARROW"
Usable Sensitivity:	better than 12 dBμ (4 μV)	better than 12 dBμ (4 μV)
50 dB Quieting Sensitivity:	better than 15 dBμ (5.62 μV)	better than 15 dBμ (5.62 μV)
Signal to Noise Ratio,		
MONO:	better than 75 dB	better than 75 dB
STEREO:	better than 65 dB	better than 65 dB
T. H. Distortion,		
MONO:	no more than 0.1 %	no more than 0.3 %
STEREO:	no more than 0.2 %	no more than 0.5 %
Capture Ratio:	better than 4 dB	better than 4 dB
Alternate Channel Selectivity:	better than 30 dB	better than 65 dB
Spurious Response Rejection:	better than 80 dB	better than 80 dB
Image Frequency Rejection:	better than 80 dB	better than 80 dB
IF Rejection:	better than 80 dB	better than 80 dB
AM Rejection:	better than 50 dB	better than 50 dB
Stereo Separation,		
(100 Hz):	better than 35 dB	better than 35 dB
(1 kHz):	better than 40 dB	better than 35 dB
(10 kHz):	better than 35 dB	better than 35 dB
(Hi-Blend ON, at 1 kHz):	21 ± 6 dB	21 ± 6 dB
Subcarrier Suppression:	better than 55 dB	better than 55 dB
Muting Sensitivity:	20 dBμ ± 6 dB	20 dBμ ± 6 dB
Output Level (Fixed):	1,000 mV ± 2 dB	1,000 mV ± 2 dB
Tuning Frequency Range:	87.4 ~ 109 MHz	87.4 ~ 109 MHz
Antenna Impedance:	300 ohms balanced and 75 ohms unbalanced	

General

Power Requirement,	
U. S. A. & Canada model:	AC 120 V 60 Hz
European model:	AC 220 V 50 Hz
England model:	AC 240 V 50 Hz
Power Consumption:	20 Watts
Dimensions,	
(Width):	480 mm, 19 inches
(Height):	70 mm, 2 3/4 inches
(Depth):	330 mm, 13 inches
Weight, without package	6 kg, 13.2 lbs

* Specifications are subject to change without notice.

BLOCK DIAGRAM

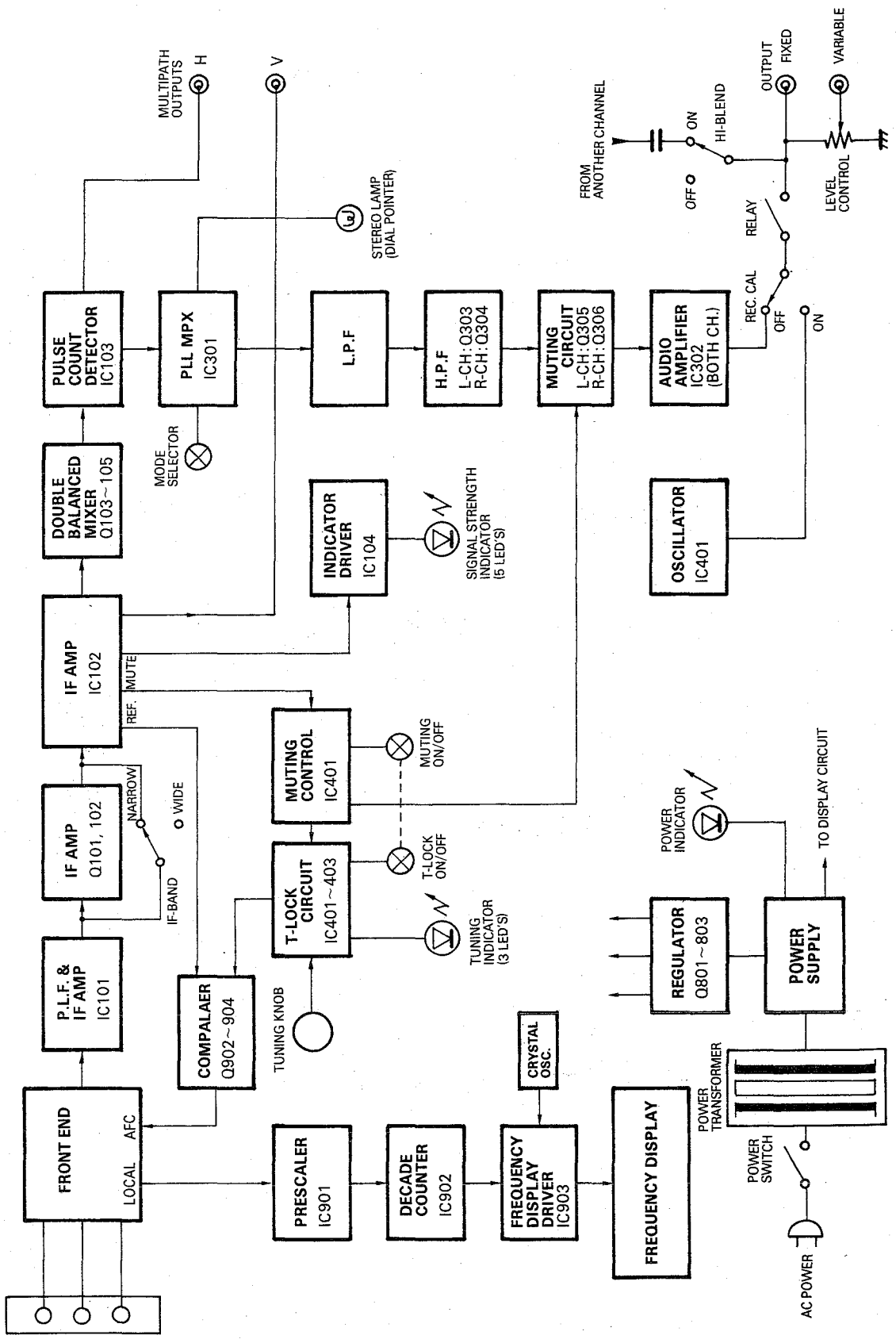


Figure 1

DISASSEMBLY

CABINET COVER REMOVAL

a. Remove four screws from both sides of the metal cover.
b. Remove four tapping screws from the top of the metal cover.
c. Lift the cover away from the unit.

BOTTOM PLATE REMOVAL

a. Remove eight tapping screws (#1 ~ #8) as shown in Photo 1.
b. Lift the bottom plate away from the unit.

FRONT PANEL REMOVAL

a. Remove TUNING knob from the front panel by using a hexagonal wrench.
b. Remove two tapping screws (#9 and #10) from the bottom of the unit as shown in Photo 1.
c. Remove two tapping screws (#1 and #2) from the top of the unit as shown in Photo 2.
d. Remove the front panel away from the unit.

POWER TRANSFORMER REMOVAL

a. Disconnect all the power transformer cables.
b. Remove two screws (#1 and #2) from the rear panel of the unit.
c. Lift the power transformer away from the unit.

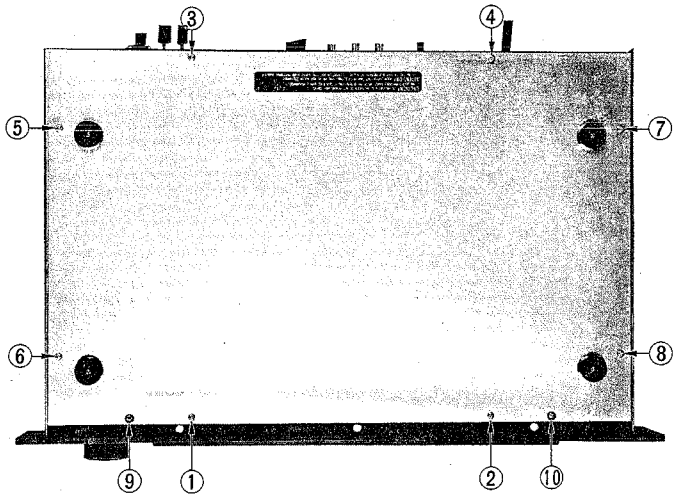


Photo 1

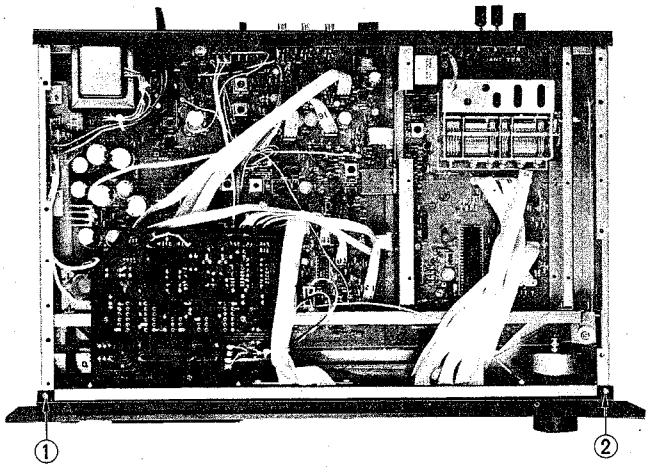


Photo 2

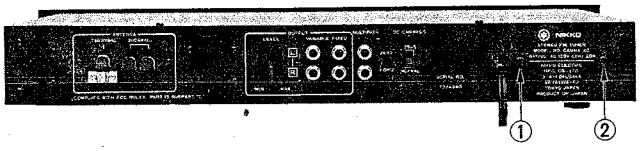


Photo 3

ALIGNMENT

TEST EQUIPMENT

Allow a minimum of 10 minutes warm-up for test equipment and the receiver to be tested.
Maintain rated line voltage.

- FM Signal Generator (FM SG)
- Oscilloscope
- AC Voltmeter
- Distortion Meter
- MPX Signal Generator (MPX SG)
- Frequency Counter
- DC Voltmeter
- RF Voltmeter

GENERAL ALIGNMENT INSTRUCTION

Always observe response curve on oscilloscope during alignment procedure:

1. Do not apply signal from FM stations.
   Apply signals only.
2. Use of excessive signal from FM SG can cause overloading of the tuner circuits. To properly align the tuner, adjust FM SG output level control so that response curve on oscilloscope is not distorted.

FM SECTION

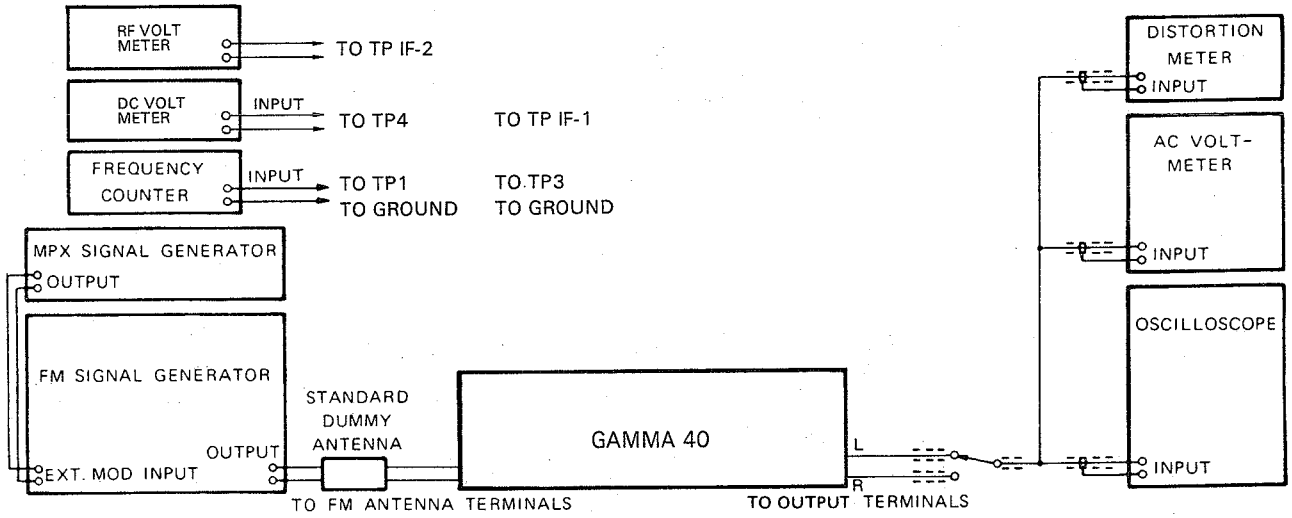


Figure 2 Test Equipment Hook-up

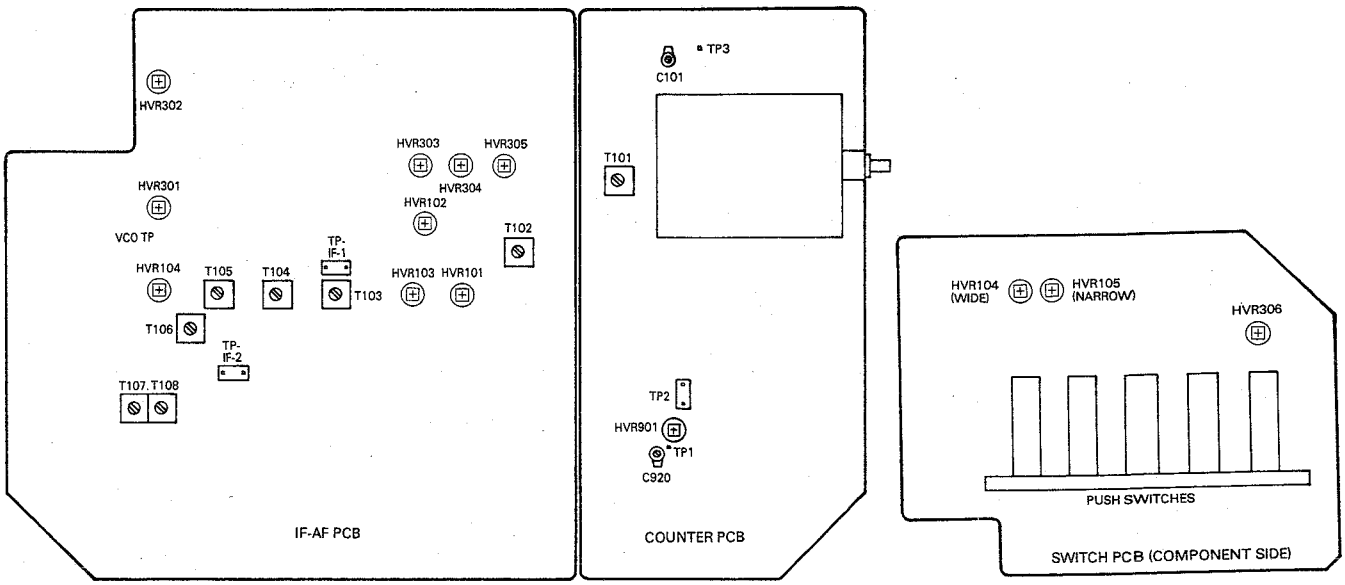


Figure 3 Adustment Points

Frequency Display Circuit Adjustment

STEP	FM SG FREQUENCY/ CALIBRATION	MODULATING FREQUENCY/ DEVIATION	SWITCHES OF THE TUNER	FREQUENCY DISPLAY	ADJUST-MENT POINT	PROCEDURE	REMARKS
1	(No signal)		A. POWER to "ON" B. REC CAL to "OFF" C. IF BAND to "NARROW" D. HI-BLEND to "OFF" E. MODE to "MONO" F. T-LOCK to "OFF"	Any frequency	C920 (Figure 3)	Connect frequency counter to "TP1" (Fig. 3) and adjust for 4,000 kHz ±9 Hz.	
2	98 MHz/60 dBμ	(Unmodulated carrier)			TUNING KNOB of the tuner.	Connect frequency counter to "TP3" (Fig.3) and adjust for 10.7 MHz ±30 kHz.	
3a				98 MHz (Refer to PROCEDURE)	HVR901 (Figure 3)	Adjust until FRE-QUENCY DISPLAY indicates 98 MHz.	
				98 MHz	HVR901 (Figure 3)	Connect DC voltmeter to "TP4" (Fig. 3). Adjust so that volt-meter's reading changes from 8 V to 0 V.	This adjust-ment is only for W-type.
3b				98 MHz	HVR901 (Figure 3)	Connect 10 kohms resistor across "TP2". Adjust until turning on and off of the digit stops.	This adjust-ment is for E & B-type.

FM-IF Alignment

STEP	FM SG FREQUENCY/ CALIBRATION	MODULATING FREQUENCY/ DEVIATION	SWITCHES OF THE TUNER	FREQUENCY DISPLAY	ADJUSTMENT POINT	PROCEDURE
1	98 MHz/60 dBμ	400 Hz/mono [±75 kHz]	A. POWER to "ON" B. REC CAL to "OFF" C. HI-BLEND to "OFF" D. MODE to "MONO" E. IF BAND to "NARROW" F. T-LOCK to "OFF"	98 MHz	T106 ↓ T105 ↓ T104 (Figure 3)	Connect RF voltmeter to "TP-IF2" (Fig. 3) and adjust for maximum voltmeter indication.
2					HVR104 (Figure 3)	Adjust until RF volt-meter indicates more than 0.7 V r.m.s.
3					T103 (Figure 3)	Connect DC voltmeter to "TP-IF1" (Fig. 3) and adjust for 0 ± 50 mV.
4			A ~ E: same as above. F. T-LOCK to "ON"		T103 (Figure 3)	Connect frequency counter to "TP3" (Fig.3) and adjust for 10.7 MHz ±30 kHz.
5	98 MHz/10 dBμ		A ~ D: same as above. E. IF BAND to "WIDE" F. T-LOCK to "OFF"		T101 C102 (Figure 3)	Adjust for minimum distortion.

STEP	FM SG FREQUENCY/ CALIBRATION	MODULATING FREQUENCY/ DEVIATION	SWITCHES OF THE TUNER	FREQUENCY DISPLAY	ADJUSTMENT POINT	PROCEDURE
6	98 MHz/10 dBμ	400 Hz/mono [±75 kHz]	A ~ D & F: same as above. E. IF BAND to "NARROW"	98 MHz	T102 (Figure 3)	Adjust for minimum distortion.
7		1 kHz/mono [±75 kHz]	A ~ D & E: same as above. F. T-LOCK to "ON"		C101 ↓ HVR102 ↓ T102 (Figure 3)	Adjust for minimum distortion.

Muting Circuit Adjustment

STEP	FM SG FREQUENCY/ CALIBRATION	MODULATING FREQUENCY/ DEVIATION	SWITCHES OF THE TUNER	FREQUENCY DISPLAY	ADJUSTMENT POINT	PROCEDURE
1	98 MHz/20 dBμ	400 Hz/mono [±75 kHz]	A. POWER to "ON B. REC CAL to "OFF" C. HI-BLEND to "OFF" D. MODE to "STEREO" E. T-LOCK to "OFF" F. IF BAND to WIDE"	98 MHz	HVR103 (Figure 3)	Adjust until audio output is no longer present on oscilloscope.
2			A ~ E: same as above. F. IF BAND to "NARROW"		HVR101 (Figure 3)	

LED Signal Strength Display Circuit Adjustment

STEP	FM SG FREQUENCY/ CALIBRATION	MODULATING FREQUENCY/ DEVIATION	SWITCHES OF THE TUNER	FREQUENCY DISPLAY	ADJUSTMENT POINT	PROCEDURE
1	98 MHz/50 dBμ	400 Hz/mono [±75 kHz]	A. POWER to "ON" B. REC CAL to "OFF" C. HI-BLEND to "OFF" D. MODE to "MONO" E. T-LOCK to "OFF" F. IF BAND to "WIDE"	98 MHz	Potentiometer "WIDE" (Figure 3)	Adjust until five signal-strength display LED's light up.
2			A ~ E: same as above. F. IF BAND to "NARROW"		Potentiometer "NARROW" (Figure 3)	
3	(No signal)		Same as above.	Where no signal is tuned.	HVR101 (Figure 3)	Adjust until any signal-strength display LED no longer lights up.

FM MPX Alignment

STEP	FM SG FREQUENCY/ CALIBLATION	MODULATING FREQUENCY/ DEVIATION	SWITCHES OF THE TUNER	LED FREQUENCY DISPLAY	ADJUST-MENT POINT	PROCEDURE	REMARKS
1	98 MHz/60 dBμ	(Unmodulated carrier)	A. POWER to "ON" B. REC CAL to "OFF" C. IF BAND to "NARROW" D. HI-BLEND to "OFF" E. MODE to "STEREO" F. T-LOCK to "OFF"	98 MHz	HVR301 (Figure 3)	Connect frequency counter to "VCO TP" (Figure 4) and adjust for 76 kHz.	
2		Pilot signal only: ±7.5 kHz			HVR302 (Figure 3)	Adjust for minimum AC voltmeter deflection . Check that stereo indicator lamp lights up.	Outputs of right and left channel should be equal.
3		1000 Hz/stereo [main (L) & sub (L): ±67.5 kHz/ pilot signal: ±7.5 kHz]			HVR305 (Figure 3)	Adjust for maximum separation (minimum output of right channel channel)	Both the separations (both the outputs of right and left channel) should be equal.
4		1000 Hz/stereo [main (R) & sub (−R): ±67.5 kHz/ pilot signal: ±7.5 kHz]				Adjust for maximum separation (minimum output of left channel)	

Record Calibration Circuit Adjustment

1. Connect a AC voltmeter to the output terminal of the tuner.
2. Set the POWER switch and "REC CAL" switch to ON.
3. Adjust the potentiometer HVR306 (refer to Fig. 3) so that the AC voltmeter indicates 333 mV r.m.s.

DIAL CORD INSTALLATION

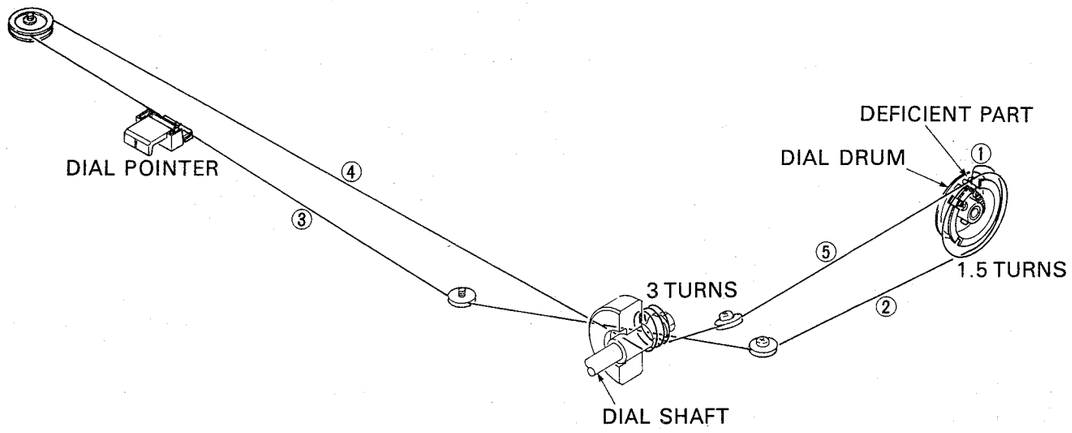
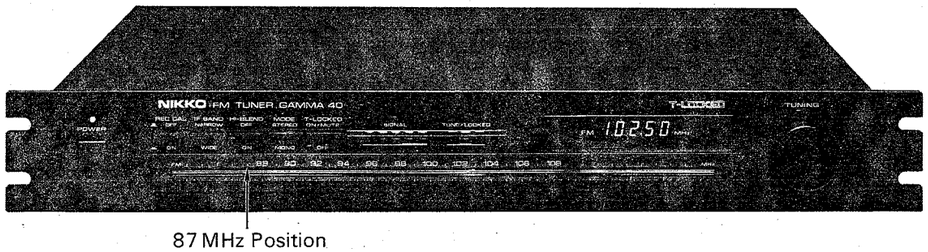


Figure 4



87 MHz Position

Photo 4

1. Remove an old dial cord.

2. Turn the dial drum shaft counter-clockwise until the rotor of the variable capacitor is completely out of the stator. If the deficient part of the dial drum is not in a straight line with the dial drum shaft (vertically), loosen the dial drum drive screws and adjust the dial drum to be placed on the top protion. Then re-tighten the dial drum screws.

3. String the dial drum and pulleys with a new dial cord in accordance with Fig. 4 (in circled numbered order).

4. Turn the dial shaft (Tuning knob) counter-clockwise until the rotor of the variable capacitor is fully rotated in the stator. Then fix the dial pointer to the string at a reading of 87 MHz on the dial scale. (See Photo 4)

PARTS LOCATION

NOTE: Numbers of three digits with a ◯ are related to the KEY NUMBER on parts list.

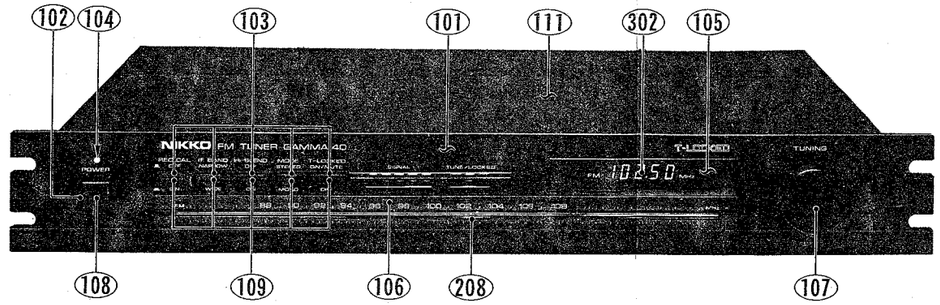


Photo 5

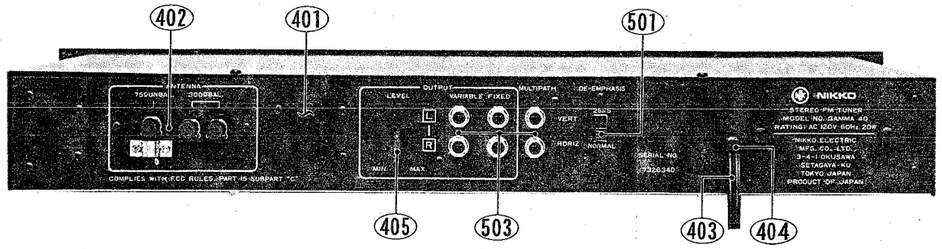


Photo 6

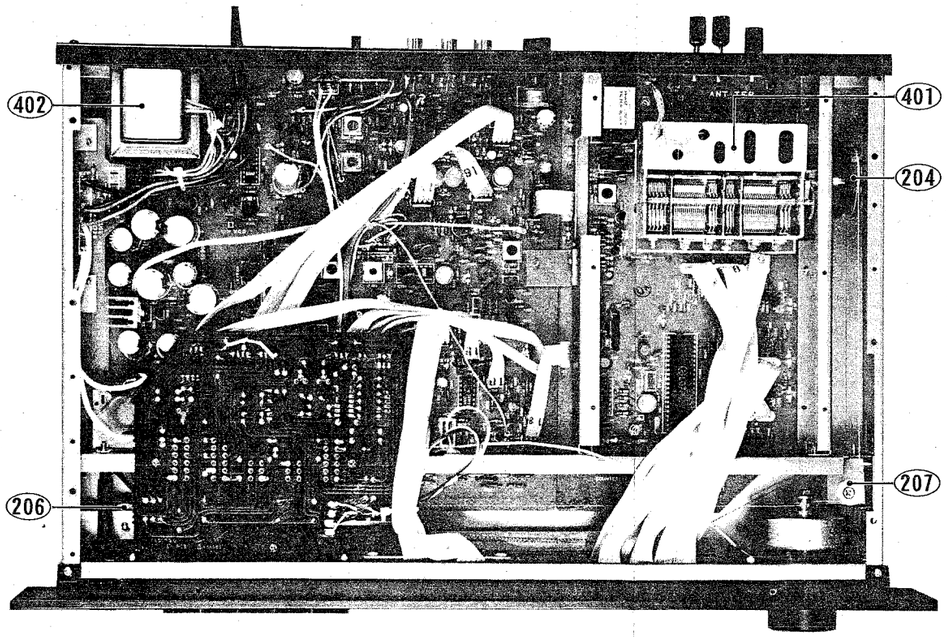
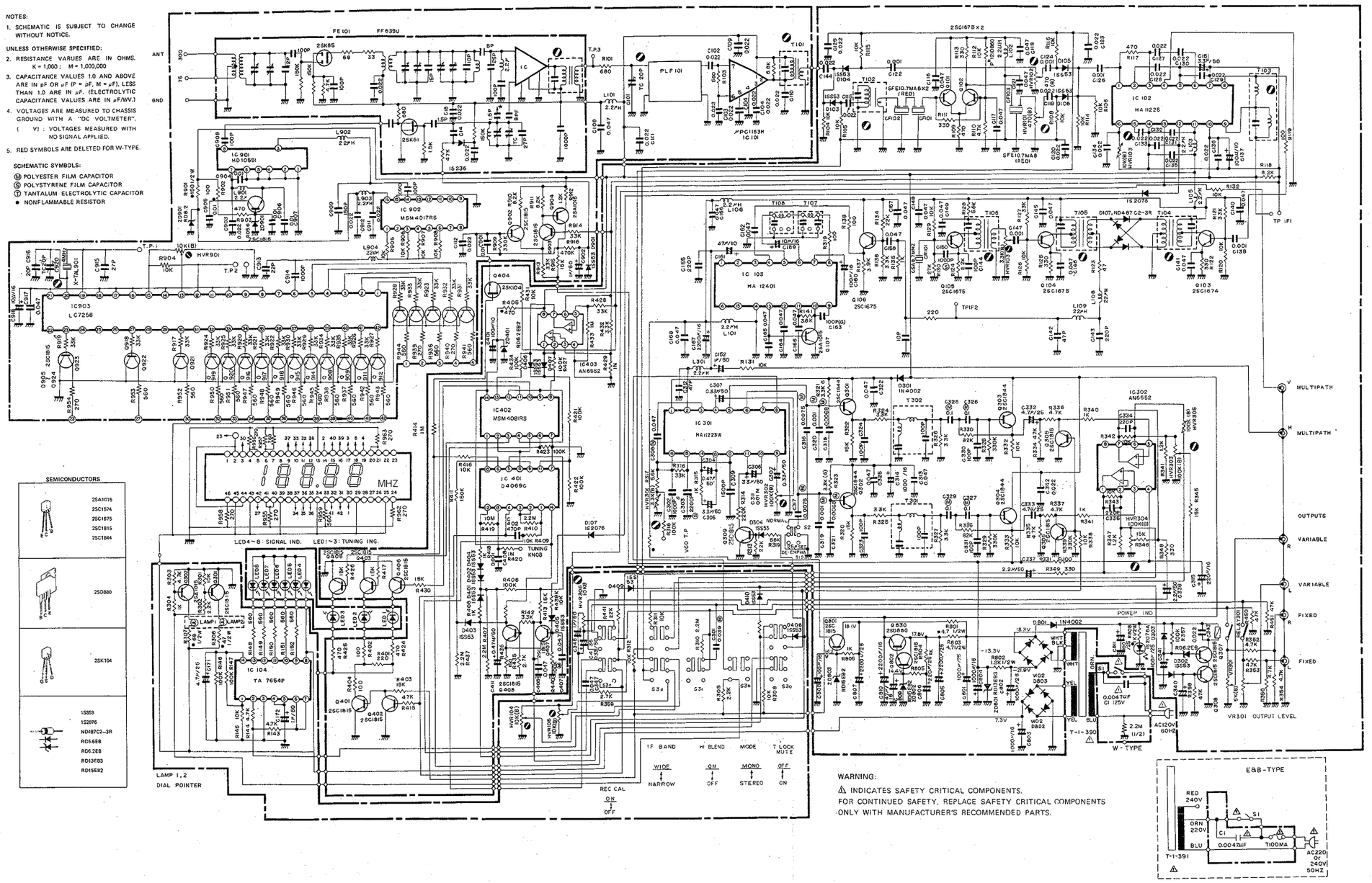


Photo 7

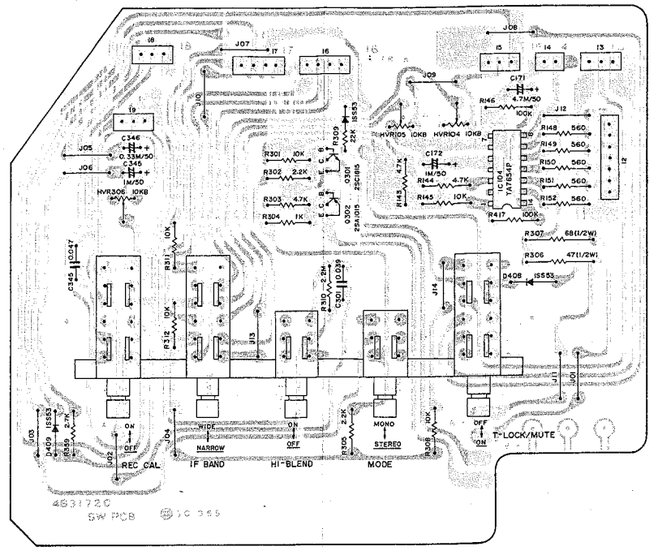
SCHEMATIC DIAGRAM



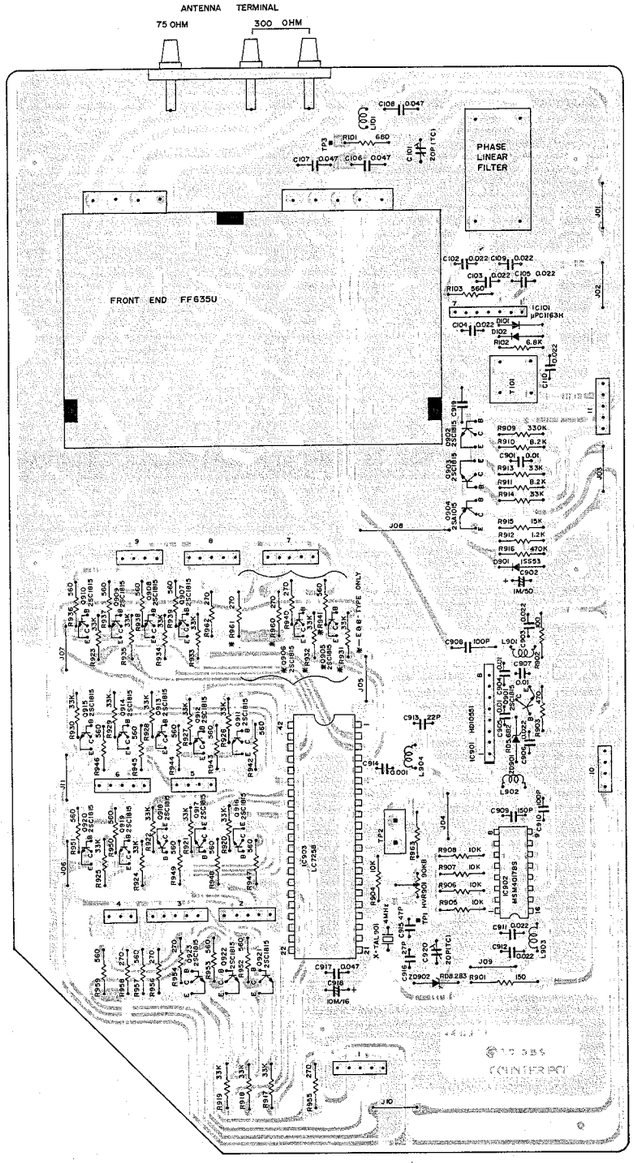
WARNING:

⚠ INDICATES SAFETY CRITICAL COMPONENTS.
FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.

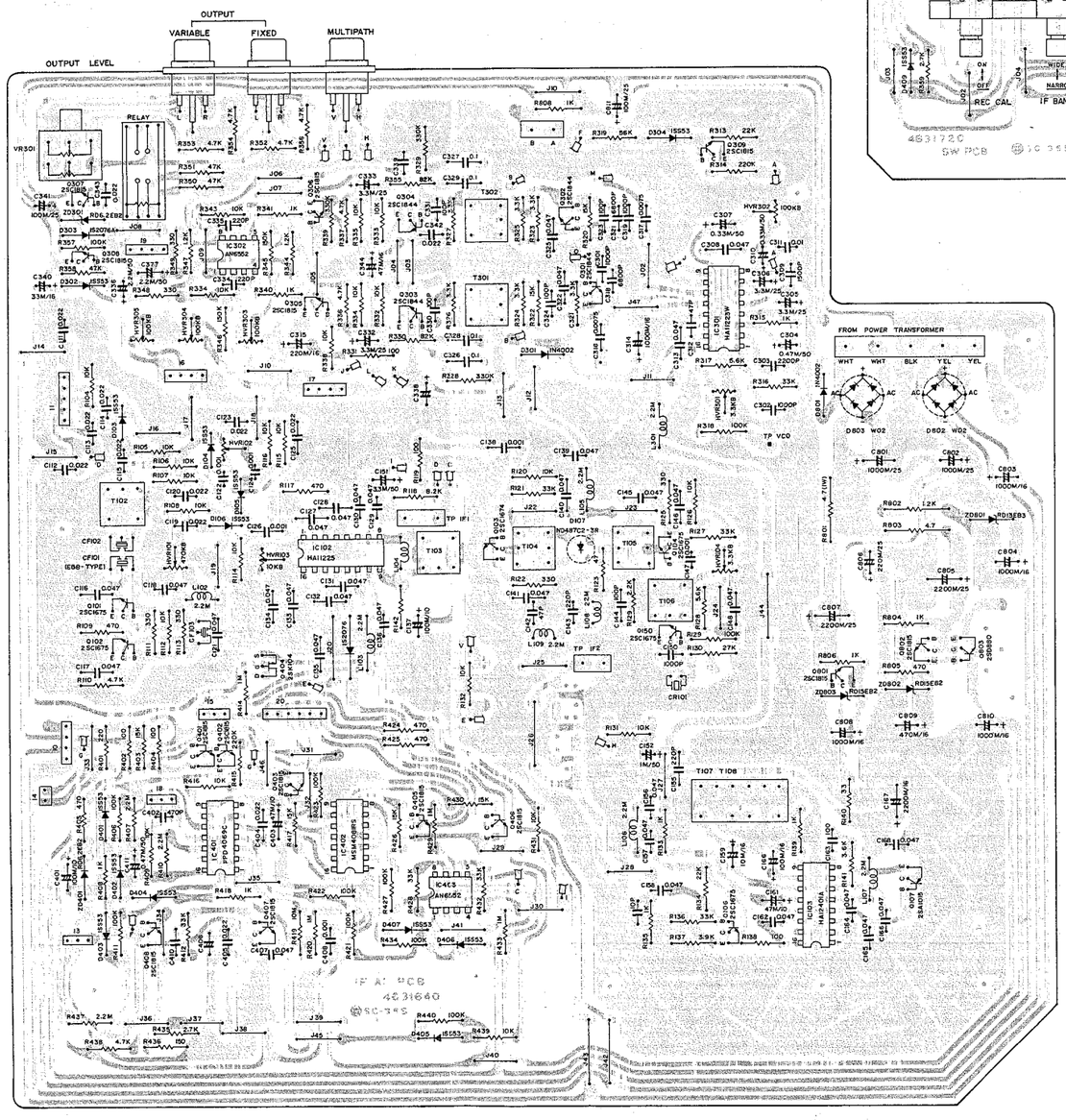
P. C. BOARD (BOTTOM VIEW)



SW PCB



COUNTER PCB



IF AF PCB

Figure 6

PARTS LIST

1. ★ The KEY NUMBER (#) marked with a (★) on parts list relate to number of three digits with a (◯). (Photo 5~7)
2. + Numberals in file indicate the quantity of parts used in one type.
3. ++ TR : Transistor
   FET : Field effect transistor
   VR : Volume control (Variable resistor)
   RES : Carbon film fixed resistor
   MO-RES : Metal oxide film fixed resistor
   CEM-RES : Cemented wirewound fixed resistor
   FP : Flame proof
   C-CAP : Ceramic capacitor
   E-CAP : Aluminum electrolytic capacitor
   M-CAP : Polyester film capacitor
   S-CAP : Polystyrene film capacitor
   T-CAP : Tantalum electrolytic capacitor
   BP-CAP : Bipolar electrolytic capacitor
   LC-CAP : Low current leakage electrolytic capacitor.
4. Assemblies and parts are subject to change without notice.
5. Parts ordering procedure:
   A. DO NOT USE THE "KEY" NUMBER AND "SYMBOL" NUMBER. *(these are control # for the factory only)*
   B. Include in any order
      a. Part number.
      b. Part description.
      c. Model number.
      (any of the above lacking from an order may delay shipment of that order.)

CAUTION:

The ⚠ mark, the KEY NO. and the SYMBOL NO. circled with rectangle in the schematic diagram and the shaded area in the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list.

KEY NO.	SYMBOL NO.	TYPE+ W E B	DESCRIPTION++	PART NO.
			PACKING MATERIALS & ACCESSORIES	
001		1 1 1	Carton box	9825730
002		2 2 2	Pad	9840930
003		1 1 1	Sack, polyethylen cloth	9640720
004		1 1 1	Sack, polyethylen cloth – #13	9640320
005a		1 – –	Manual, instructions – in English and French	960339E
005b		– 1 1	Manual, instructions – in five different languages	960339K
006		1 – –	Card, warranty	967010A
007		1 – –	Manual, safety instructions	9670410
008		1 – –	List, service stations	9690180
009		1 1 1	Antenna, FM – Q-MATCH	4581360
010		1 1 1	Cord, RCA phono pin plug – 2T-1 (NK)	962014A
			CABINET ASSEMBLY	
★101a		1 1 1	Panel, front – SILVER	7885000
★101b		1 1 1	Panel, front – BLACK	7885010
★102		1 1 1	Guide, button – P15SQBK – power switch	7402680
★103		1 1 1	Guide, button – P5319BK – five elements	7402690
★104		1 1 1	Globe, power indicator	7402120
★105		1 1 1	Window, frequency display	7802610
★106a		1 1 1	Dial scale – SILVER	7802620
★106b		1 1 1	Dial scale – BLACK	7802630
★107a		1 1 1	Knob – 2GL-34 – tuning, SILVER	7851660
★107b		1 1 1	Knob – 2BK-34 – tuning, BLACK	7851750
★108a		1 1 1	Button, push – M15SQGL – power, SILVER	7852380
★108b		1 1 1	Button, push – M15SQBK – power, BLACK	7852390
★109		5 5 5	Button, push – P319BK – others	7852410
110		5 5 5	Shaft, extension – 31.5M	7401890
★111a		1 – –	Cover, top	7820850
★111b		– 1 1	Cover, top	7820860
112		1 1 1	Plate, bottom	7326380
113		4 4 4	Foot, plastic	7401350
			CHASSIS ASSEMBLY	
⚠ 201a		1 – –	Switch, push – U62SV TV-5 – power	4041480
⚠ 201b		– 1 1	Switch, push – ESB-70823S – power	4041600
⚠ 202a		1 – –	C-CAP 0.0047uf AC125V	239472C
⚠ 202b		– 1 1	C-CAP 0.0047uf AC400V	239472S
⚠ 203		– 1 1	Cover, C-CAP	7400960
★204		1 1 1	Dial drum – 37φ	7400860
205		1 1 1	Spring – (R)	7440380

KEY NO.	SYMBOL NO.	TYPE+ W E B	DESCRIPTION++	PART NO.
★206		1 1 1	Pulley – 20φ	7400830
★207		3 3 3	Pulley – 9φ	7400790
★208		1 1 1	Dial pointer assembly	7860610
			FRONT CHASSIS ASSEMBLY	
301		1 1 1	Holder, LED's	7402700
★302		1 1 1	LED counter display	5060290
303		6 6 6	LED PG5531KY – green	5060170
304		2 2 2	LED TLY208 – yellow	5060250
305		1 1 1	Holder, dial shaft	7402750
			BACK PLATE ASSEMBLY	
★401a		1 – –	Plate, back – (W)	7326340
★401b		– 1 1	Plate, back – (E)	7326350
⚠ ★402a		1 – –	Transformer, power – T-1-390 – AC120V	1103900
⚠ ★402b		– 1 1	Transformer, power – T-1-391 – AC220 or 240V	1103910
⚠ ★403a		1 – –	Cord, AC line – DP-70	606007A
⚠ ★403b		– – 1	Cord, AC line – CEE-2T	600510A
⚠ ★403c		– – 1	Cord, AC line – BS	600514A
⚠ ★404a		1 – –	Bush, power cord – SR3P-4	7400620
⚠ ★404b		– 1 1	Bush, power cord – SR4N-4	7400690
★405		1 1 1	Knob – P2BK16LVD – output level	7851800
			COUNTER PC BOARD ASSEMBLY	
			(RF SECTION)	
★401		1 1 1	Front end – FF635U	4910190
★402		1 1 1	Terminal, antenna – 3PM	4450590
		2 2 2	Phase linear filter	1280350
	T101	1 1 1	Transformer, FM-IF	1240400
	L101	1 1 1	Coil – 2.2uH	1210860
	IC101	1 1 1	IC μPC1163H	518060S
	Q902,903	2 2 2	TR 2SC1815 (Y or GR)	512107S
	Q904	1 1 1	TR 2SA1015 (Y or GR)	510102S
	D901	1 1 1	Diode 1SS53	501023S

PART ORDERING PROCEDURE ----- DO NOT USE THE "KEY" NUMBER AND "SYMBOL" NUMBER. (these are control # for the factory only.) Include in any order: a. Part number, b. Part description, c. Model number. (any of the above lacking from an order may delay shipment of the order.)

KEY NO.	SYMBOL NO.	TYPE+ W E B	DESCRIPTION++	PART NO.
	C101	1 1 1	Capacitor, trimmer – 20P	4241060
	C102~105	4 4 4	C-CAP 0.022uf +80, –20% 50V YG	231223Z
	C106~108	3 3 3	C-CAP 0.047uf +80, –20% 50V YG	231473Z
	C110,119	2 2 2	C-CAP 0.022uf +80, –20% 50V YG	231223Z
	C901	1 1 1	M-CAP 0.01uf 10% 50V	222103K
	C902	1 1 1	E-CAP 1uf 50V	211510Q
	R909	1 1 1	RES 330kohm 5% ¼W	328334J
	R910,911	2 2 2	RES 8.2kohm 5% ¼W	328822J
	R912	1 1 1	RES 1.2kohm 5% ¼W	328122J
	R913,914	2 2 2	RES 33kohm 5% ¼W	328333J
	R915	1 1 1	RES 15kohm 5% ¼W	328153J
	R916	1 1 1	RES 470kohm 5% ¼W	328474J
			(COUNTER SECTION)	
	X901	1 1 1	Crystal, quartz – 4MHz	1280650
	L901,903	2 2 2	Coil – 2.2uH	1210860
	L902,904	2 2 2	Coil – 22uH	1210930
	IC901	1 1 1	IC HD10551	518093S
	IC902	1 1 1	IC MSM4017RS	518092S
	IC903	1 1 1	IC LC7258	518091S
		182020	TR 2SC1815 (Y or GR)	512107S
	ZD901	1 1 1	Zener diode RD5.6EB	502042S
	ZD902	1 1 1	Zener diode RD8.2EB3	502076S
	C920	1 1 1	Capacitor, trimmer – 20P	4241060
	C903,906	2 2 2	C-CAP 0.022uf +80, –20% 50V YG	231223Z
	C904,905	2 2 2	C-CAP 0.01uf +80, –20% 50V YG	231103Z
	C907	1 1 1	C-CAP 0.01uf +80, –20% 50V YG	231103Z
	C908,910	2 2 2	C-CAP 100pf 10% 50V SL	232101K
	C911,912	2 2 2	C-CAP 0.022uf +80, –20% 50V YG	231223Z
	C913	1 1 1	C-CAP 22pf 10% 50V SL	232220K
	C914	1 1 1	C-CAP 0.001uf +80, –20% 50V YG	231102Z
	C915	1 1 1	C-CAP 47pf 10% 50V NPO	232470C
	C916	1 1 1	C-CAP 27pf 10% 50V NPO	232270C
	C917	1 1 1	C-CAP 0.047uf +80, –20% 50V YG	231473Z
	C918	1 1 1	E-CAP 10uf 16V	211220Q
	R901	1 1 1	FP-MO-RES 150ohm 5% ½W	360151L
	R902	1 1 1	FP-RES 100ohm 5% ¼W	328101L
	R903	1 1 1	RES 470ohm 5% ¼W	328471J
	R904~908	5 5 5	RES 10kohm 5% ¼W	328103J
	R917~935	191919	RES 33kohm 5% ¼W	328333J
	R936~939	4 4 4	RES 560ohm 5% ¼W	328561J
	R940	1 1 1	RES 270ohm 5% ¼W	328271J
	R941~953	131313	RES 560ohm 5% ¼W	328561J
	R954,956	2 2 2	RES 270ohm 5% ¼W	328271J
	R957,959	2 2 2	RES 560ohm 5% ¼W	328561J
	R958,960	2 2 2	RES 270ohm 5% ¼W	328271J
	R961,962	2 2 2	RES 270ohm 5% ¼W	328271J
			IF-AF PC BOARD ASSEMBLY	
			(IF SECTION)	
	T102	1 1 1	Transformer, FM-IF – 10.7 MHz	1240430
	T103	1 1 1	Transformer, FM-IF – 10.7 MHz	1240390
	T104	1 1 1	Transformer, FM-IF – 10.7 MHz	1240420
	T105	1 1 1	Transformer, FM-IF – 8.74 MHz	1240440
	T106	1 1 1	Transformer, FM-IF – 8.74 MHz	1240410
	T107	1 1 1	Low pass filter – KM10DB	1280680
	T108	1 1 1	Low pass filter – KM10DB	1280690
	L102~107	5 5 5	Coil – 2.2uH	1210860
	L108,109	2 2 2	Coil – 22uH	1210930

KEY NO.	SYMBOL NO.	TYPE+ W E B	DESCRIPTION++	PART NO.
	CR101	1 1 1	Ceramic resonator – 8.74 MHz	1280670
	CF101~103	3 3 3	Ceramic filter – SFM-MA8 – red	128023A
	IC102	1 1 1	IC HA11225	518070S
	IC103	1 1 1	IC HA12401A	518094S
	Q101,102	2 2 2	TR 2SC1675 (L or M)	515082S
	Q103	1 1 1	TR 2SC1674 (L or M)	515083S
	Q104~106	3 3 3	TR 2SC1675 (L or M)	515082S
	Q107	1 1 1	TR 2SA1015 (Y or GR)	510102S
	D103~106	4 4 4	Diode 1SS53	501023S
	D107	1 1 1	Shotky barrier diode ND487C2-3R	507001S
	C112~115	4 4 4	C-CAP 0.022uf +80, –20% 50V YG	231223Z
	C116~118	3 3 3	C-CAP 0.047uf 5% 25V	232473J
	C120	1 1 1	C-CAP 0.022uf +80, –20% 50V YG	231223Z
	C121	1 1 1	C-CAP 0.047uf 5% 25V	232473J
	C122,124	2 2 2	C-CAP 0.001uf +80, –20% 50V YG	231102Z
	C123,125	2 2 2	C-CAP 0.022uf +80, –20% 50V YG	231223Z
	C126	1 1 1	C-CAP 0.001uf +80, –20% 50V YG	231102Z
	C127~136	101010	C-CAP 0.047uf +80, –20% 50V YG	231473Z
	C137	1 1 1	E-CAP 100uf 10V	211130Q
	C138	1 1 1	C-CAP 0.001uf +80, –20% 50V YG	231102Z
	C139~141	3 3 3	C-CAP 0.047uf +80, –20% 50V YG	231473Z
	C142	1 1 1	C-CAP 47pf 10% 50V SL	232470K
	C143	1 1 1	C-CAP 220pf 10% 50V SL	232221K
	C144	1 1 1	C-CAP 100pf 50V	232101C
	C145,146	2 2 2	C-CAP 0.047uf +80, –20% 50V YG	231473Z
	C147	1 1 1	C-CAP 0.001uf +80, –20% 50V YG	231102Z
	C148,149	2 2 2	C-CAP 0.047uf +80, –20% 50V YG	231473Z
	C150	1 1 1	S-CAP 1000pf 5% 50V	223102J
	C151	1 1 1	E-CAP 3.3uf 50V	211513Q
	C152	1 1 1	E-CAP 1uf 50V	211510Q
	C155	1 1 1	C-CAP 220pf 10% 50V SL	232221K
	C156~158	3 3 3	C-CAP 0.047uf 5% 25V	232473J
	C159	1 1 1	E-CAP 10uf 16V	211220L
	C160	1 1 1	E-CAP 100uf 16V	211230Q
	C161	1 1 1	E-CAP 47uf 10V	211125Q
	C162	1 1 1	C-CAP 0.047uf 5% 25V	232473J
	C163	1 1 1	S-CAP 100pf 2% 50V	223101G
	C164~166	3 3 3	C-CAP 0.047uf 5% 25V	232473J
	C167	1 1 1	E-CAP 2200uf 16V	211242S
	C168	1 1 1	C-CAP 0.047uf 5% 25V	232473J
	HVR101,102	2 2 2	Potentiometer – 470ohm (B)	4301400
	HVR103	1 1 1	Potentiometer – 10kohm (B)	4300510
	HVR104	1 1 1	Potentiometer – 3.3kohm (B)	4301320
	R104~108	5 5 5	RES 10kohm 5% ¼W	328103J
	R109	1 1 1	RES 470ohm 5% ¼W	328471J
	R111	1 1 1	RES 330ohm 5% ¼W	328331J
	R112	1 1 1	RES 10kohm 5% ¼W	328103J
	R113	1 1 1	RES 330ohm 5% ¼W	328331J
	R114~116	3 3 3	RES 10kohm 5% ¼W	328103J
	R117	1 1 1	RES 470ohm 5% ¼W	328471J
	R118	1 1 1	RES 8.2kohm 5% ¼W	328822J
	R119	1 1 1	RES 100ohm 5% ¼W	328101J
	R120	1 1 1	RES 10kohm 5% ¼W	328103J
	R121	1 1 1	RES 33kohm 5% ¼W	328333J
	R122	1 1 1	RES 330ohm 5% ¼W	328331J
	R123	1 1 1	RES 47ohm 5% ¼W	328470J
	R124	1 1 1	RES 2.2kohm 5% ¼W	328222J
	R125	1 1 1	RES 330ohm 5% ¼W	328331J
	R126	1 1 1	RES 10kohm 5% ¼W	328103J
	R127	1 1 1	RES 33kohm 5% ¼W	328333J
	R128	1 1 1	RES 5.6kohm 5% ¼W	328562J
	R129	1 1 1	RES 100kohm 5% ¼W	328104J
	R130	1 1 1	RES 27kohm 5% ¼W	328273J
	R131,132	2 2 2	RES 10kohm 5% ¼W	328103J
	R133	1 1 1	RES 1kohm 5% ¼W	328102J
	R134	1 1 1	RES 22kohm 5% ¼W	328223J
	R135	1 1 1	RES 1kohm 5% ¼W	328102J
	R136	1 1 1	RES 33kohm 5% ¼W	328333J
	R137	1 1 1	RES 3.9kohm 5% ¼W	328392J

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KEY NO.	SYMBOL NO.	TYPE+ W E B	DESCRIPTION++	PART NO.
	R138	1 1 1	RES 100ohm 5% ¼W	328101J
	R139	1 1 1	RES 1kohm 5% ¼W	328102J
	R140	1 1 1	FP-RES 33ohm 5% ¼W	328330L
	R141	1 1 1	RES, metal film 3.6kohm 2% ¼W	304362G
			(DETECTOR SECTION)	
	IC401	1 1 1	IC μPD4069C	518072S
	IC402	1 1 1	IC MSM4081RS	518095S
	IC403	1 1 1	IC HA17458PS	518120S
	Q401~403	3 3 3	TR 2SC1815 (Y or GR)	512107S
	Q404	1 1 1	FET 2SK104 (F)	516026S
	Q405~408	4 4 4	TR 2SC1815 (Y or GR)	512107S
	D401~407	7 7 7	Diode 1SS53	501023S
	ZD401	1 1 1	Zener diode RD6.2EB2	502048S
	C401	1 1 1	E-CAP 100uf 10V	211130Q
	C403	1 1 1	E-CAP 47uf 10V	211125Q
	C404,405	2 2 2	C-CAP 0.022uf +80, −20% 50V YG	231223Z
	C407	1 1 1	M-CAP 0.047uf 10% 50V	222473K
	C408	1 1 1	C-CAP 0.001uf +80, −20% 50V YG	231102Z
	R401	1 1 1	RES 220ohm 5% ¼W	328221J
	R402	1 1 1	RES 100ohm 5% ¼W	328101J
	R403	1 1 1	RES 15kohm 5% ¼W	328153J
	R404	1 1 1	RES 100ohm 5% ¼W	328101J
	R405	1 1 1	FP-RES 470ohm 5% ¼W	328471L
	R406	1 1 1	RES 100kohm 5% ¼W	328104J
	R407	1 1 1	RES 2.2meg-ohm 5% ¼W	328225J
	R408	1 1 1	RES 1kohm 5% ¼W	328102J
	R409	1 1 1	RES 10kohm 5% ¼W	328103J
	R410	1 1 1	RES 2.2meg-ohm 5% ¼W	328225J
	R411	1 1 1	RES 100kohm 5% ¼W	328104J
	R412	1 1 1	RES 3.3kohm 5% ¼W	328332J
	R413	1 1 1	RES 1.5kohm 5% ¼W	328152J
	R414	1 1 1	RES 1meg-ohm 5% ¼W	328105J
	R415	1 1 1	RES 220kohm 5% ¼W	328224J
	R416	1 1 1	RES 10kohm 5% ¼W	328103J
	R417	1 1 1	RES 15kohm 5% ¼W	328153J
	R418	1 1 1	RES 1kohm 5% ¼W	328102J
	R419	1 1 1	RES 10meg-ohm 5% ¼W	328106J
	R420	1 1 1	RES 1meg-ohm 5% ¼W	328105J
	R421~423	3 3 3	RES 100kohm 5% ¼W	328104J
	R424,425	2 2 2	RES 470ohm 5% ¼W	328471J
	R426	1 1 1	RES 15kohm 5% ¼W	328153J
	R427	1 1 1	RES 100kohm 5% ¼W	328104J
	R428	1 1 1	RES 33kohm 5% ¼W	328333J
	R429	1 1 1	RES 1meg-ohm 5% ¼W	328105J
	R430	1 1 1	RES 15kohm 5% ¼W	328153J
	R431	1 1 1	RES 10kohm 5% ¼W	328103J
	R432	1 1 1	RES 33kohm 5% ¼W	328333J
	R433	1 1 1	RES 1meg-ohm 5% ¼W	328105J
	R434	1 1 1	RES 100kohm 5% ¼W	328104J
	R435	1 1 1	RES 2.7kohm 5% ¼W	328272J
	R436	1 1 1	RES 150ohm 5% ¼W	328151J
	R437	1 1 1	RES 2.2meg-ohm 5% ¼W	328225J
	R438	1 1 1	RES 4.7kohm 5% ¼W	328472J
	R439	1 1 1	RES 10kohm 5% ¼W	328103J
	R440	1 1 1	RES 100kohm 5% ¼W	328104J
			(MPX SECTION)	
*501		1 1 1	Switch, slide — SL-13 — de emphasis selector	4020640
502	VR301	1 1 1	VR GM80R — 5kohm (B) — output level	4310640
*503		1 1 1	Terminal, RCA phono pin jack — 2Px3	4446020
	T301,302	2 2 2	Low pass filter — KM10DB — 38kHz filter	1270140
	L301	1 1 1	Coil — 22uH	1210860
	IC301	1 1 1	IC HA11223W	518054S

KEY NO.	SYMBOL NO.	TYPE+ W E B	DESCRIPTION++	PART NO.
	IC302	1 1 1	IC AN6552	518096S
	Q301~304	4 4 4	TR 2SC1844 (E or F)	512106S
	Q305,306, Q309	3 3 3	TR 2SC1815 (Y or GR)	512107S
	D301	1 1 1	Diode 1N4002	560066S
	C302	1 1 1	S-CAP 1000pf 5% 50V	223102V
	C303	1 1 1	S-CAP 2200pf 5% 50V	223222V
	C304	1 1 1	LC-CAP 0.47uf 50V	211505L
	C305,306	2 2 2	E-CAP 3.3uf 25V	211313S
	C307	1 1 1	E-CAP 0.33uf 50V	211503S
	C308	1 1 1	M-CAP 0.047uf 5% 50V	222473J
	C309	1 1 1	S-CAP 1500pf 5% 50V	223152V
	C310	1 1 1	E-CAP 0.33uf 50V	211503S
	C311	1 1 1	M-CAP 0.01uf 5% 50V	222103J
	C312	1 1 1	C-CAP 47pf 10% 50V SL	232470K
	C313	1 1 1	C-CAP 0.047uf +80, −20% 50V YG	231473Z
	C314	1 1 1	E-CAP 1000uf 16V	211240S
	C315	1 1 1	E-CAP 220uf 16V	211232Q
	C316,317	2 − −	M-CAP 0.015uf 5% 50V	222153J
	C316,317	− 2 2	M-CAP 0.0075uf 5% 50V	228725J
	C318	1 1 1	M-CAP 0.0068uf 5% 50V	222682J
	C319,320	2 2 2	M-CAP 0.001uf 5% 50V	222102J
	C321	1 1 1	M-CAP 0.0068uf 5% 50V	222682J
	C322	1 1 1	C-CAP 0.047uf +80, −20% 50V YG	231473Z
	C323,324	2 2 2	C-CAP 100pf 10% 50V SL	232101K
	C325	1 1 1	C-CAP 0.047uf +80, −20% 50V YG	231473Z
	C326~329	4 4 4	M-CAP 0.1uf 5% 50V	222104J
	C330,331	2 2 2	C-CAP 100pf 10% 50V	232101K
	C332,333	2 2 2	E-CAP 3.3uf 25V	211313S
	C334,335	2 2 2	C-CAP 220pf 10% 50V SL	232221K
	C336,337	2 2 2	E-CAP 2.2uf 50V	211512Q
	HVR301	1 1 1	Potentiometer — 3.3kohm (B)	4301320
	HVR302 ~HVR305	4 4 4	Potentiometer — 100kohm (B)	4301140
	R313	1 1 1	RES 22kohm 5% ¼W	328223J
	R314	1 1 1	RES 220kohm 5% ¼W	328224J
	R315	1 1 1	RES 1kohm 5% ¼W	328102J
	R316	1 1 1	RES 33kohm 5% ¼W	328333J
	R317	1 1 1	RES 5.6kohm 5% ¼W	328562J
	R318	1 1 1	RES 100kohm 5% ¼W	328104J
	R319	1 1 1	RES 56kohm 5% ¼W	328563J
	R320,322	2 2 2	RES 10kohm 5% ¼W	328153J
	R321,323	2 2 2	RES, metal film 3.3kohm 2% ¼W	304332G
	R324~327	4 4 4	RES 3.3kohm 5% ¼W	328332J
	R328,329	2 2 2	RES 330kohm 5% ¼W	328334J
	R330	1 1 1	RES 82kohm 5% ¼W	328823J
	R331	1 1 1	FP-RES 100ohm 5% ¼W	328101L
	R332~335	4 4 4	RES 10kohm 5% ¼W	328103J
	R336,337	2 2 2	RES 4.7kohm 5% ¼W	328472J
	R338	1 1 1	RES 10kohm 5% ¼W	328103J
	R339	1 1 1	RES 330kohm 5% ¼W	328334J
	R340,341	2 2 2	RES 1kohm 5% ¼W	328102J
	R342,343	2 2 2	RES 10kohm 5% ¼W	328103J
	R344	1 1 1	RES 1.2kohm 5% ¼W	328122J
	R345,346	2 2 2	RES 150kohm 5% ¼W	328154J
	R347	1 1 1	RES 1.2kohm 5% ¼W	328122J
	R348,349	2 2 2	RES 330ohm 5% ¼W	328331J
	R350,351	2 2 2	RES 47kohm 5% ¼W	328473J
	R352~356	4 4 4	RES 4.7kohm 5% ¼W	328472J
			(POWER SUPPLY SECTION)	
		1 1 1	Res relay — FRL644D12	1700140
	Q307,308	2 2 2	TR 2SC1815 (Y or GR)	512107S
	Q801,802	2 2 2	TR 2SC1815 (Y or GR)	512107S
	Q803	1 1 1	TR 2SD880 (Y or GR)	513106S
	D302	1 1 1	Diode 1SS53	501023S
	D303	1 1 1	Diode 1S2076	501019S

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KEY NO.	SYMBOL NO.	TYPE+ W E B	DESCRIPTION++	PART NO.
	D304	1 1 1	Diode 1S2076A	501020S
	D801	1 1 1	Diode 1N4002	560066S
	D802	1 1 1	Diode W02	560061S
	ZD801	1 1 1	Zener diode RD13EB3	502063S
	ZD802,803	2 2 2	Zener diode RD15EB2	502050S
	ZD804	1 1 1	Zener diode RD6.2EB2	502048S
	C340	1 1 1	E-CAP 33uf 16V	211223Q
	C341	1 1 1	E-CAP 100uf 25V	211330Q
	C343	1 1 1	C-CAP 0.022uf +80, −20% 50V YG	231223Z
	C801,802	2 2 2	E-CAP 1000uf 25V	211340S
	C803,804	2 2 2	E-CAP 1000uf 16V	211240S
	C805	1 1 1	E-CAP 2200uf 25V	211342S
	C806	1 1 1	E-CAP 220uf 25V	211332Q
	C807	1 1 1	E-CAP 2200uf 25V	211342S
	C808,810	2 2 2	E-CAP 1000uf 16V	211240S
	C809	1 1 1	E-CAP 470uf 16V	211235S
	C811	1 1 1	E-CAP 100uf 25V	211330Q
	R357	1 1 1	RES 100kohm 5% ¼W	328104J
	R358	1 1 1	RES 47kohm 5% ¼W	328473J
	R801,803	2 2 2	FP-MO-RES 4.7ohm 5% ½W	360478L
	R802	1 1 1	FP-MO-RES 1.2kohm 5% ½W	360122L
	R804,806	2 2 2	RES 1kohm 5% ¼W	328102J
	R805	1 1 1	RES 470ohm 5% ¼W	328471J
	R808	1 1 1	FP-MO-RES 1kohm 5% ½W	360102L
			SWITCH PC BOARD ASSEMBLY	
			(SWITCH SECTION)	
		1 1 1	Switch, penta push	4041570
	IC104	1 1 1	IC TA7654P	518090S
	Q301	1 1 1	TR 2SC1815 (Y or GR)	512107S
	Q302	1 1 1	TR 2SA1015 (Y or GR)	510102S
	D408~410	3 3 3	Diode 1SS53	501023S

KEY NO.	SYMBOL NO.	TYPE+ W E B	DESCRIPTION++	PART NO.
	C171	1 1 1	E-CAP 4.7uf 50V	211515Q
	C172	1 1 1	E-CAP 1uf 50V	211510Q
	C301	1 1 1	M-CAP 0.039uf 5% 50V	222393J
	C345	1 1 1	E-CAP 1uf 50V	211510Q
	C346	1 1 1	E-CAP 0.33uf 50V	211503S
	C347	1 1 1	C-CAP 0.047uf +80, −20% 50V YG	231473Z
	HVR104,105, HVR306	3 3 3	Potentiometer 10kohm (B)	4300510
	R143,144	2 2 2	RES 4.7kohm 5% ¼W	328472J
	R145	1 1 1	RES 10kohm 5% ¼W	328103J
	R146,147	2 2 2	RES 100kohm 5% ¼W	328104J
	R148~152	5 5 5	RES 560ohm 5% ¼W	328561J
	R301	1 1 1	RES 10kohm 5% ¼W	328103J
	R302	1 1 1	RES 2.2kohm 5% ¼W	328222J
	R303	1 1 1	RES 4.7kohm 5% ¼W	328472J
	R304	1 1 1	RES 1kohm 5% ¼W	328102J
	R305	1 1 1	RES 2.2kohm 5% ¼W	328222J
	R306	1 1 1	FP-MO-RES 47ohm 5% ½W	360470L
	R307	1 1 1	FP-MO-RES 68ohm 5% ½W	360680L
	R308	1 1 1	RES 10kohm 5% ¼W	328103J
	R309	1 1 1	RES 22kohm 5% ¼W	328223J
	R310	1 1 1	RES 2.2meg-ohm 5% ¼W	328225J
	R311,312	2 2 2	RES 10kohm 5% ¼W	328103J
	R359	1 1 1	RES 2.7kohm 5% ¼W	328272J
			(FUSE SECTION)	
⚠		−1 1	Midget fuse – T100MA 250V	4720430
⚠		1 −−	RES 2.2meg-ohm 10% ½W	325225K
			(POWER INDICATOR SECTION)	
		1 1 1	LED BR5504S – red	5060300
		1 1 1	Spacer, LED	7903160

SEMICONDUCTOR DATA

TRANSISTORS

† NOTES Ge: Germanium Si: Silicon

A: Alloy B: Base D: Diffused Dd: Double-diffused

Df: Drift-field E: Epitaxial G: Grown J: Junction

M: Mesa P: Planer Pc: Point-contact Td: Triple-diffused

DEVICE TYPE	APPLICATIONS	STRUCTURE†	MAXIMUM RATINGS Absolute-Maximum Values: (T_A = 25°C unless otherwise specified)					ELECTRICAL CHARACTERISTICS Typical Values: (T_A = 25°C unless otherwise specified)														MANUFACTURER
			Collector-to Base Voltage V_{CBO} (V)	Emitter-to Base Voltage V_{EBO} (V)	Collector Current I_C (mA)	Collector Dissipation P_C (mW)	Junction Temperature T_J (°C)	Collector Cutoff Current I_{CBO} (uA)	V_{CB} (V)	Static Forward-Current Transfer Ratio h_{FE}	V_{CE} (V)	I_C (mA)	Collector-Emitter Saturation Voltage $V_{CE(sat)}$ (V)	I_C (mA)	I_B (mA)	Gain-Bandwidth Product f_T f_{ob}* (MHz)	V_{CE} V_{CB}* (V)	I_E I_C* (mA)	Output Capacitance C_{ob} (pF)	Others	
2SA1015 (Y, GR)	AF, General	PNP Si-E	−50	−5	−100	400	125	−0.1 max.	−50	120 ~ 400	−6	−2	−0.3 max.	−100	−10	80 min.	−10	−1*	7 max.		TOSHIBA
2SC1674 (L, M)	RF, Mixer, Osc. (in FM radio)	NPN Si-E	30	4	20	250	125	0.1 max.	30	40 ~ 120	6	1	0.3 max.	10	1	600	6	−1	1.3 max.		NEC
2SC1675 (L, M)	RF, Mixer, Osc. (in FM radio)	NPN Si-E	50	5	30	250	125	0.1 max.	50	40 ~ 120	6	1	0.3 max.	10	1	250	6	−1		Cc · rb'b = 10 ps	NEC
2SC1815 (Y, GR)	AF, General	NPN Si-E	60	5	100	400	125	0.1 max.	60	120 ~ 400	6	2	0.25 max.	100	10	80 min.	10	1*	3 max.		TOSHIBA
2SC1844 (E, F)	AF, Low noise	NPN Si-E	60	5	100	500	125	0.05 max.	60	300 ~ 800	6	1	0.3 max.	100	10	100	6	−1	8 max.		NEC
2SD880 (Y, GR)	AF, Power amp	NPN Si-Td	60	7	3A	30W (Tc=25°C)	150	100 max.	60	100 ~ 300	5	0.5A	1 max.	3A	300	3	5	0.5A	70		TOSHIBA

FIELD EFFECT TRANSISTOR

DEVICE TYPE	APPLICATIONS	STRUCTURE†	MAXIMUM RATINGS Absolute-Maximum Values: (T_A = 25°C unless otherwise specified)						ELECTRICAL CHARACTERISTICS Typical Values: (T_A = 25°C unless otherwise specified)																MANUFACTURER
			Gate-to-Drain Voltage V_{GDO} (V)	Gate-to-Source Voltage V_{GSO} (V)	Gate Current I_G (mA)	Drain Current I_D (mA)	Total Dissipation P_D (mW)	Channel Temperature T_{ch} (°C)	Gate Leak Current Test Conditions	I_{GSS} (mA)	Gate to Drain Breakdown Voltage Test Conditions	$V_{(BR)GDO}$ (V)	Drain Current Test Conditions	I_{DSS} (mA)	Gate to Source Cutoff Voltage Test Conditions	$V_{GS(off)}$ (V)	Forward Transfer Admittance Test Conditions	$\lvert Y_{fs}\rvert$ (mS)	Feed Back Capacitance Test Conditions	C_{rss} (pF)	Power Gain (Common Source) Test Conditions	G_{PS} (dB)	Noise Figure Test Conditions	NF (dB)	
2SK104 (F)	AF, RF General	Si N-channel junction	−30	−30	10	20	250	125	V_{GS} = −30V	10			V_{DS}=5V	1~3	V_{DS}=5V I_D=10mA	−1.1	V_{DS}=5V V_{GS}=0V f = 1 kHz	4.1	V_{DS}=10V V_{GS}=0V f = 1 kHz	0.9					NEC

DIODES, LED'S

DEVICE TYPE	APPLICATIONS	STRUCTURE†	MAXIMUM RATINGS Absolute-Maximum Values: (T_A = 25°C unless otherwise specified)								ELECTRICAL CHARACTERISTICS Typical Values: (T_A = 25°C unless otherwise specified)								MANUFACTURER
			Reverse Surge Voltage V_{Rsurge} (V)	Peak Reverse Voltage V_{RM} (V)	Reverse Voltage V_R (V)	Peak Forward Voltage V_{FM} (V)	Peak Forward Current I_{FM} (mA)	Average Rectified Current I_O (mA)	Forward Surge Current $I_{F\,surge}$ (A)	Junction Temperature T_J (°C)	Total Power Dissipation P_D (mW)	Forward Current I_{Fmin} (mA)	Test Condition V_F (V)	Forward Voltage V_{Fmax} (V)	Test Condition I_F (mA)	Reverse Current I_{Rmax} (uA)	Test Condition V_R (V)	Others	
ND487C2-3R	Double balanced modulator	Si-E								150	75			0.5 1.0	1 50				NEC
1SS53	Detector, Medium speed switching	Si-E		35	30		300	100	2	200	500			0.8 1.0	1.0 30	0.1	30		NEC
1S2076	Detector, Medium speed switching	Si-E		35	30		450	150	1	175	250			0.8	10	1	30		HITACHI
1S2076A	Detector, Medium speed switching	Si-E		70	60		450	150	1	175	250			0.8	10	1	30		HITACHI
1N4002	Rectifier	Si-DJ			100			1.0A	30	175				1.1	1A	5		R_{th} = 80°C/W	GENERAL INSTRUMENT
W02	Rectifier	Si-DJ (Bridge)			200	200		1.5A	50	125				1.0	1A	5		R_{th} = 50°C/W	GENERAL INSTRUMENT
BR-5504S	Lamp (red)	GaA1As			4		300	IF = 50		85	100			2.0	20	100	4	Iv = 80 mcd (IF = 20 mA)	STANLEY
PG-5531KY	Lamp (green)	GaP			4		100	IF = 50		85	125			2.5	20	100	4	Iv = 2.4 mcd (IF = 20 mA)	STANLEY
TLY208	Lamp (yellow)	GaP			4			IF = 25		75	70			2.8	20	100	4	Iv = 0.6 mcd (IF = 15 mA)	TOSHIBA

ZENER DIODES

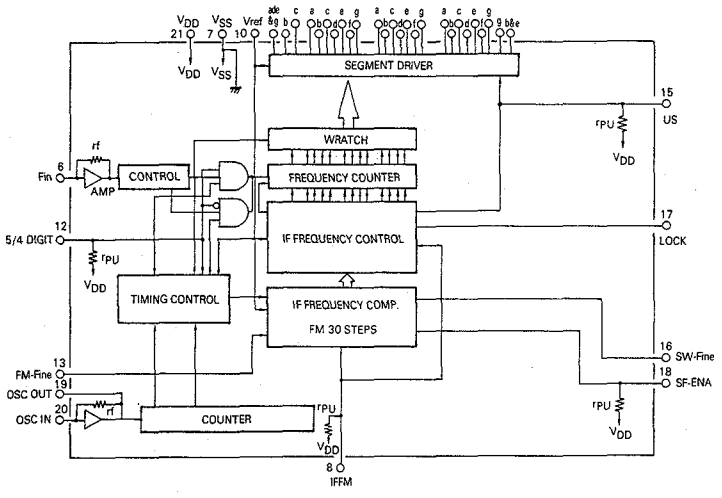
DEVICE TYPE	APPLICATIONS	STRUCTURE†	MAXIMUM RATINGS Absolute-Maximum Values: (T_A = 25°C unless otherwise specified)			ELECTRICAL CHARACTERISTICS Typical Values: (T_A = 25°C unless otherwise specified)														MANUFACTURER
			Total Power Dissipation P_D (mW)	Zener Current I_Z (A)	Junction Temperature T_J (°C)	Zener Voltage V_Z MIN (V)	TYP (V)	MAX (V)	Test Conditions I_Z (mA)	Differential Resistance r_Z TYP (Ω)	MAX (Ω)	Test Conditions I_Z (mA)	Temperature Coefficient γ_Z TYP (%/°C)	MAX (%/°C)	Test Conditions I_Z (mA)	Reverse Current I_Z MAX (μA)	Test Conditions V_R (V)	Others	
RD5.1-EB2	Regulator	Si-J	400		175	4.94		5.20	20					30	20	5	1.5		NEC
RD5.6-EB	Regulator	Si-J	400		175	5.28		5.91	20					25	20	5	2.5		NEC
RD6.2-EB2	Regulator	Si-J	400		175	5.96		6.27	20					20	20	5	3		NEC
RD8.2-EB3	Regulator	Si-J	400		175	8.03		8.45	20					10	20	2	5		NEC
RD13-EB3	Regulator	Si-J	400		175	12.99		13.66	10					25	10	2	10		NEC
RD15-EB2	Regulator	Si-J	400		175	13.89		14.62	10					30	10	2	11		NEC

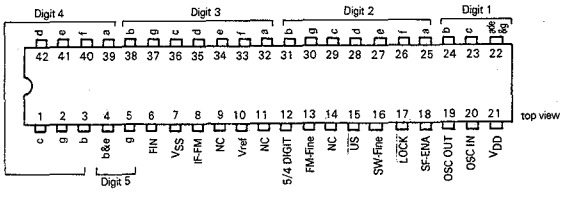
INTEGRATED CIRCUIT LC7258

FUNCTION/MANUFACTURER

- **Frequency Display Driver for Radio/Sanyo**

BLOCK DIAGRAM & CONNECTION INFORMATION





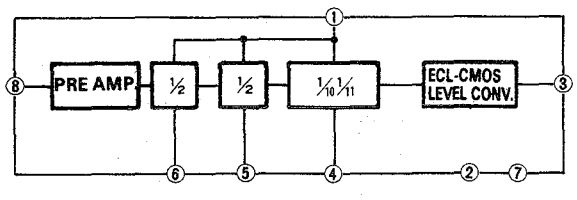
(TOP VIEW)

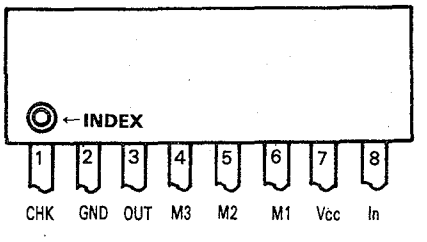
INTEGRATED CIRCUIT HD10551

FUNCTION/MANUFACTURER

- **Prescale/Hitachi**

BLOCK DIAGRAM & CONNECTION INFORMATION





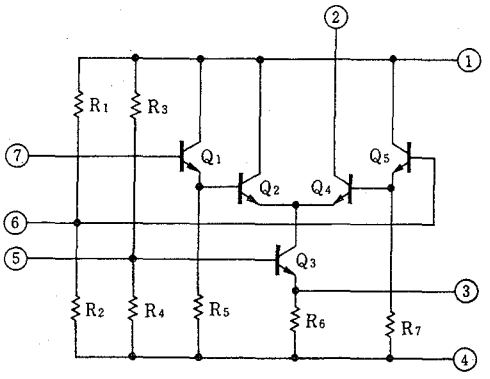
(SIDE VIEW)

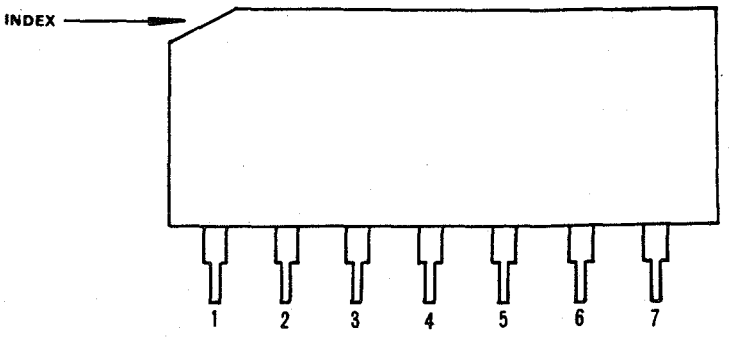
INTEGRATED CIRCUIT μPC1163H

FUNCTION/MANUFACTURER

- FM IF Amplifier/NEC

EQUIVALENT CIRCUIT & CONNECTION INFORMATION





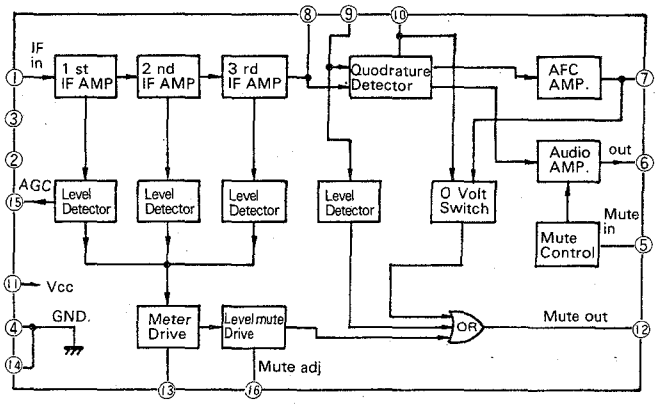
(SIDE VIEW)

INTEGRATED CIRCUIT HA11225

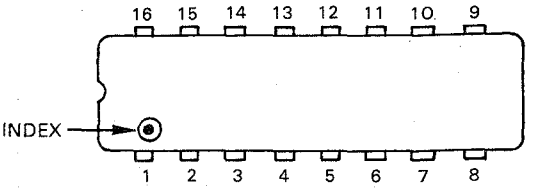
FUNCTION/MANUFACTURER

- FM IF System/Hitachi

BLOCK DIAGRAM & CONNECTION INFORMATION



(TOP VIEW)

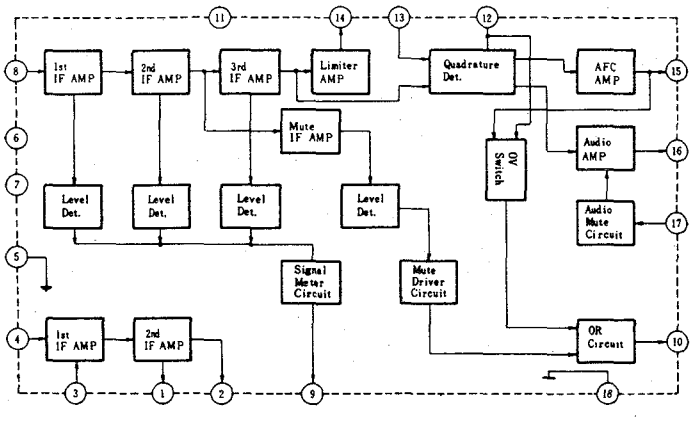


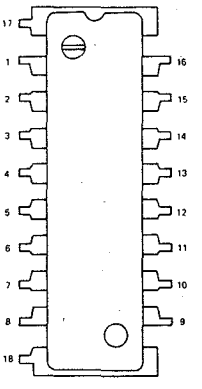
INTEGRATED CIRCUIT HA11223W

FUNCTION/MANUFACTURER

- FM Steteo Demodulator/Hitachi

BLOCK DIAGRAM & CONNECTION INFORMATION





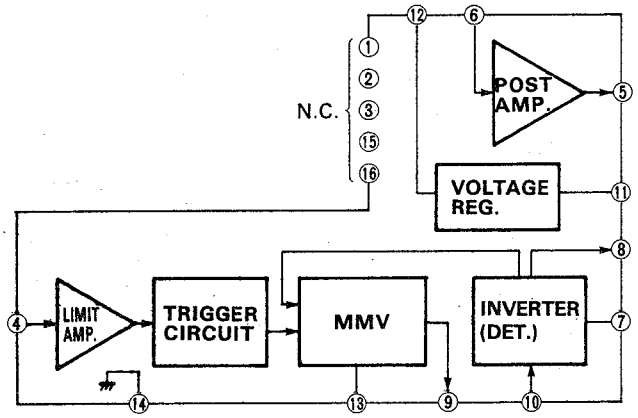
(TOP VIEW)

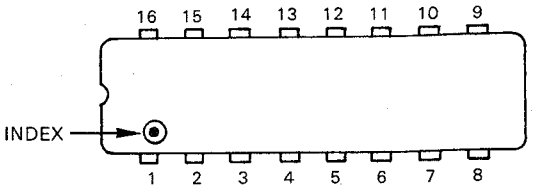
INTEGRATED CIRCUIT HA12401A

FUNCTION/MANUFACTURER

- Pulse Count Detector/Hitachi

BLOCK DIAGRAM & CONNECTION INFORMATION





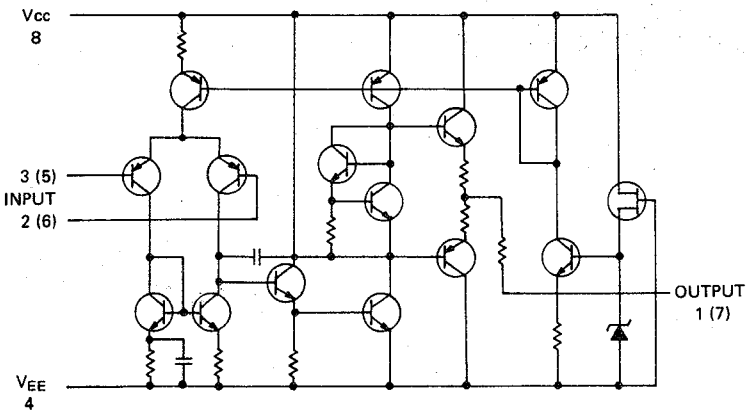
(TOP VIEW)

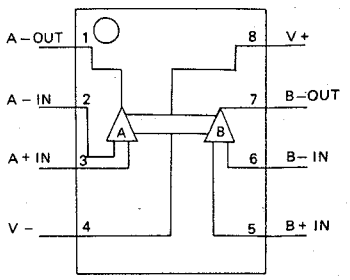
INTEGRATED CIRCUIT HA17458PS/AN6552

FUNCTION/MANUFACTURER

- Dual Operational Amplifier/Hitachi (HA17458PS), Matsushita (AN6552)

EQUIVALENT CIRCUIT & CONNECTION INFORMATION





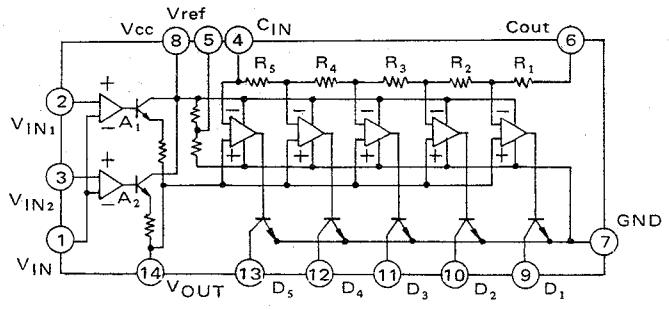
(TOP VIEW)

INTEGRATED CIRCUIT TA7654P

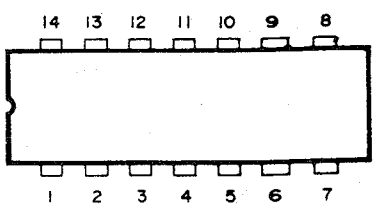
FUNCTION/MANUFACTURER

- LED Level Meter Driver/Toshiba

BLOCK DIAGRAM & CONNECTION INFORMATION



(TOP VIEW)

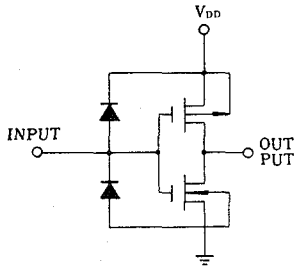


INTEGRATED CIRCUIT μPD4069C

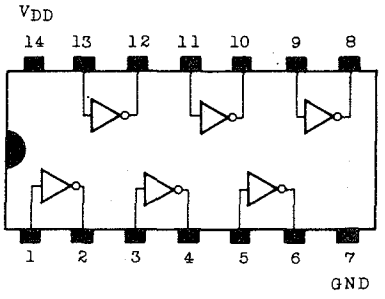
FUNCTION/MANUFACTURER

- Hex Inverter (C-MOS IC)/NEC

EQUIVALENT CIRCUIT & CONNECTION INFORMATION



(1/6 CIRCUIT SHOWN)



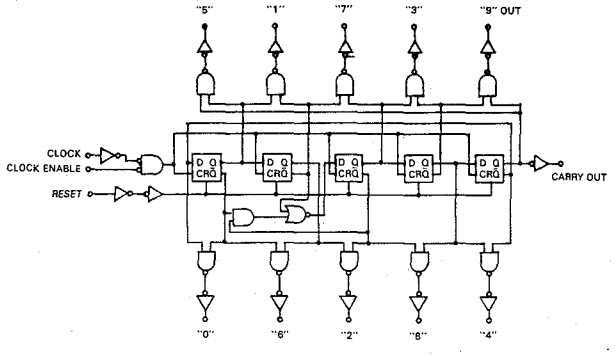
(TOP VIEW)

INTEGRATED CIRCUIT MSM4017RS

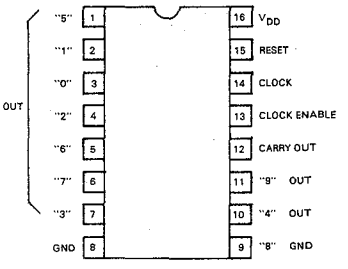
FUNCTION/MANUFACTURER

- Decade Counter (C-MOS IC)/Oki

EQUIVALENT CIRCUIT & CONNECTION INFORMATION



(1/4 CIRCUIT SHOWN)



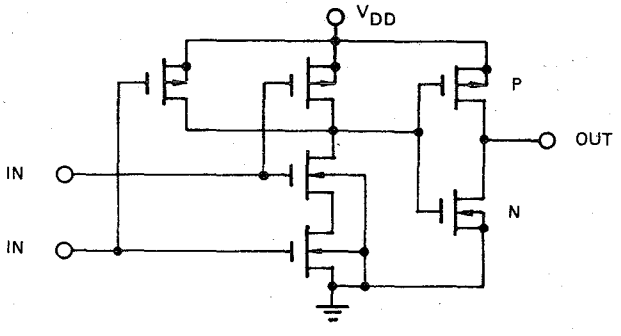
(TOP VIEW)

INTEGRATED CIRCUIT MSM4081RS

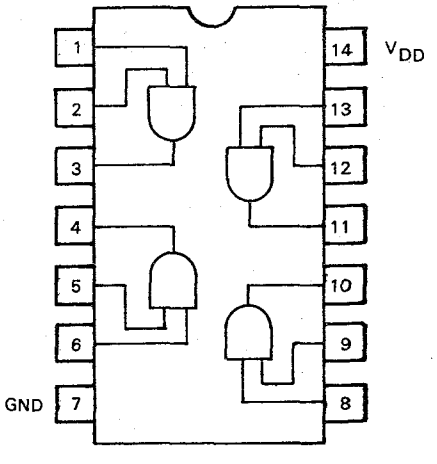
FUNCTION/MANUFACTURER

- Quad 2-Input AND Gate (C-MOS IC)/Oki

EQUIVALENT CIRCUIT & CONNECTION INFORMATION



(1/4 CIRCUIT SHOWN)



(TOP VIEW)